

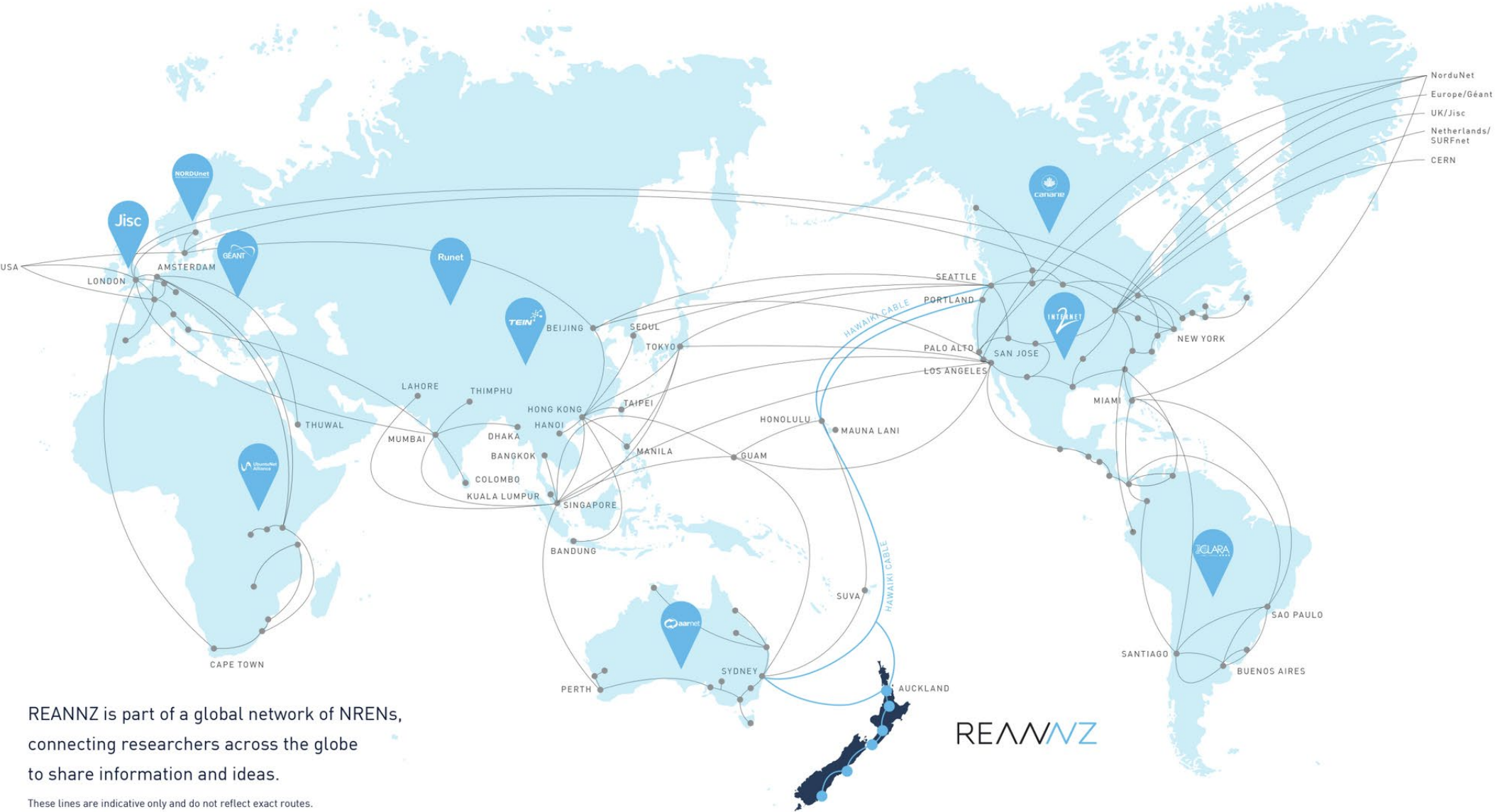
REANNZ

John Bancroft

Science and Technology Collaboration
Manager

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GLOBAL RESEARCH AND EDUCATION COMMUNITY /



REANNZ is part of a global network of NRENs, connecting researchers across the globe to share information and ideas.

These lines are indicative only and do not reflect exact routes.



Participants

48 total

UNIVERSITIES



CROWN RESEARCH INSTITUTES





INSTITUTES OF TECHNOLOGY, POLYTECHNICS AND WĀNANGA



OTHER MEMBERS



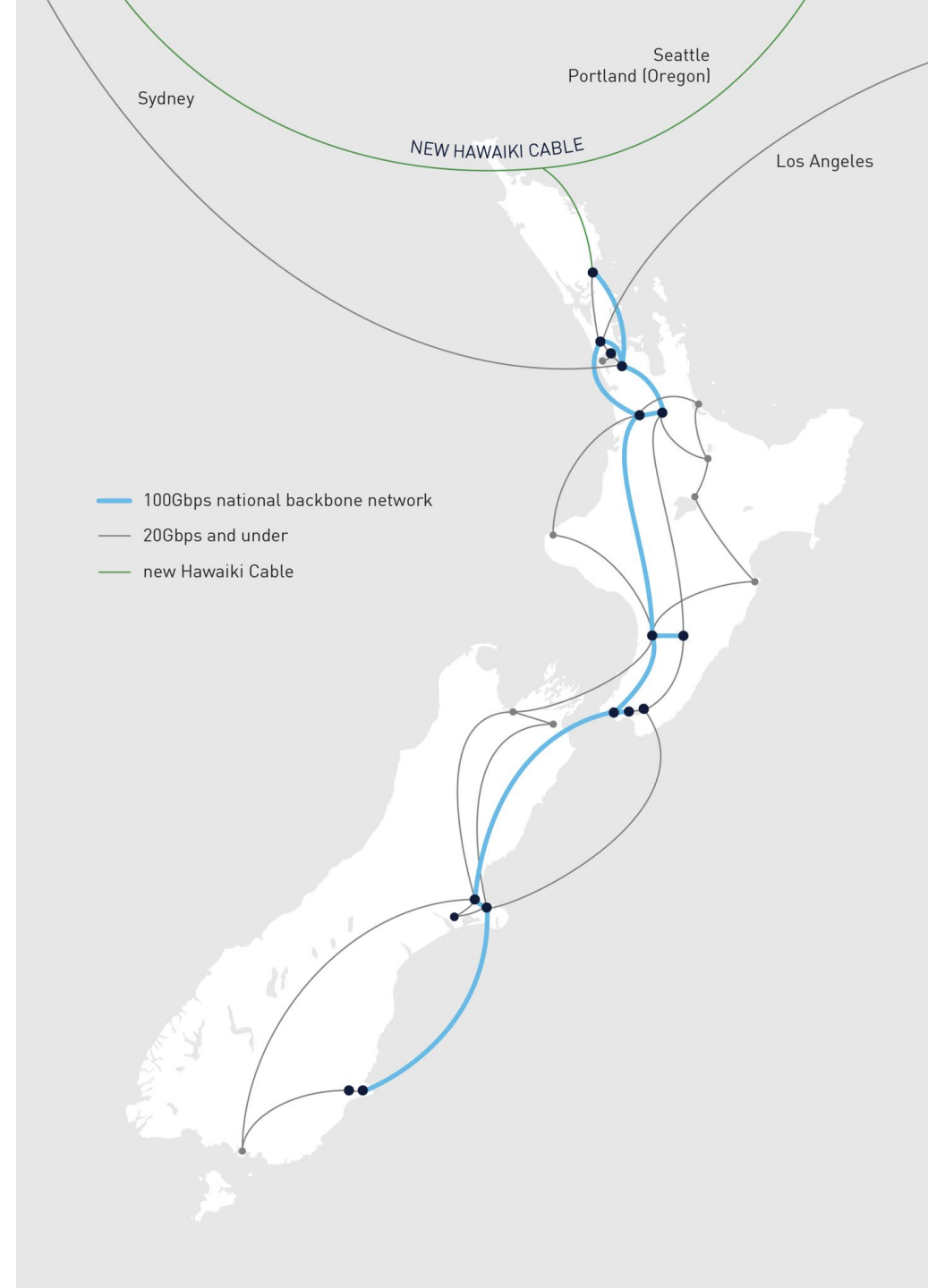
New participants



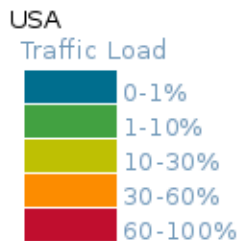
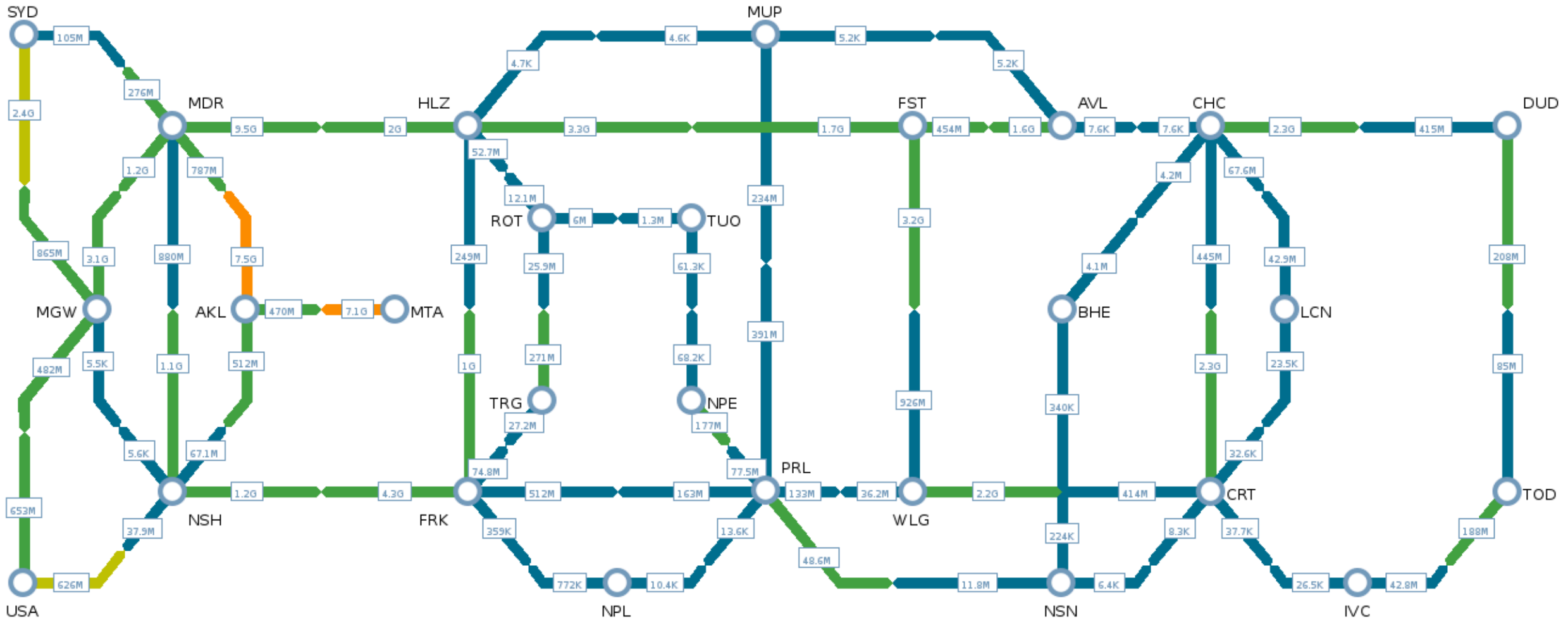
Domestic network

- Upgraded core links supporting 100G on backbone links
- Caching upgrades
 - 2x Akamai
 - 1x Facebook
 - 1x Google
 - 1x Netflix
- Monitoring upgrades

Achieved zero packet loss across our network, ie, $<0.0000001\%$ loss over 58 trillion packets.



<https://weathermap.reannz.co.nz>

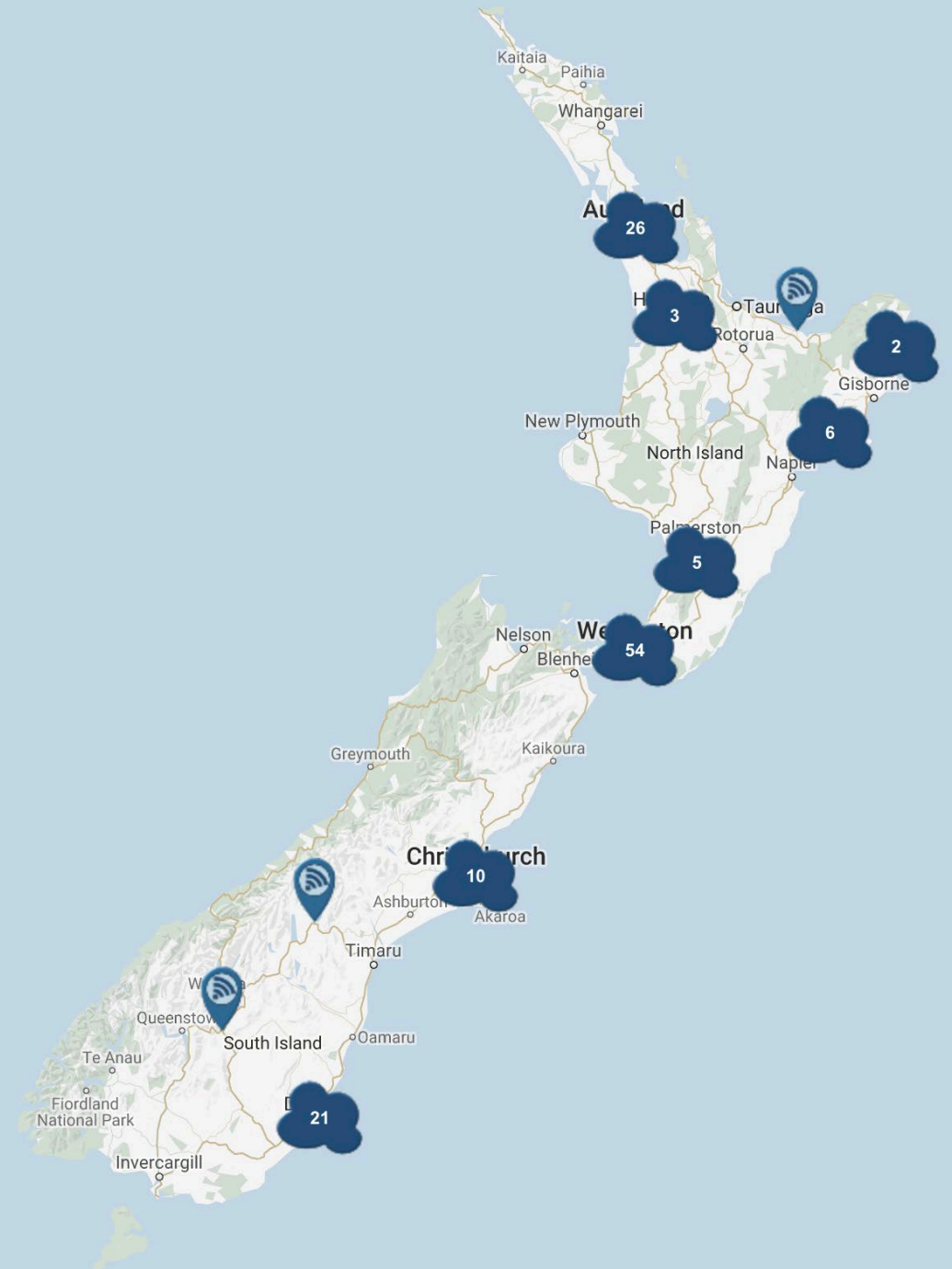


Created: Feb 14 2019 16:50:08

REANNZ
Live Weathermap

Eduroam

- 86 countries
- Tens of thousands of hotspots around the world

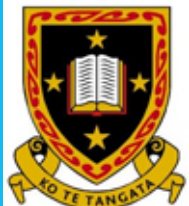


Faucet

Open source SDN Controller for production networks

Faucet is a compact open source OpenFlow controller, which enables network operators to run their networks the same way they do server clusters. Faucet moves network control functions (like routing protocols, neighbour discovery, and switching algorithms) to vendor independent server-based software, versus traditional router or switch embedded firmware, where those functions are easy to manage, test, and extend with modern systems management best practices and tools. Faucet controls OpenFlow 1.3 hardware which delivers high forwarding performance.

REANZ



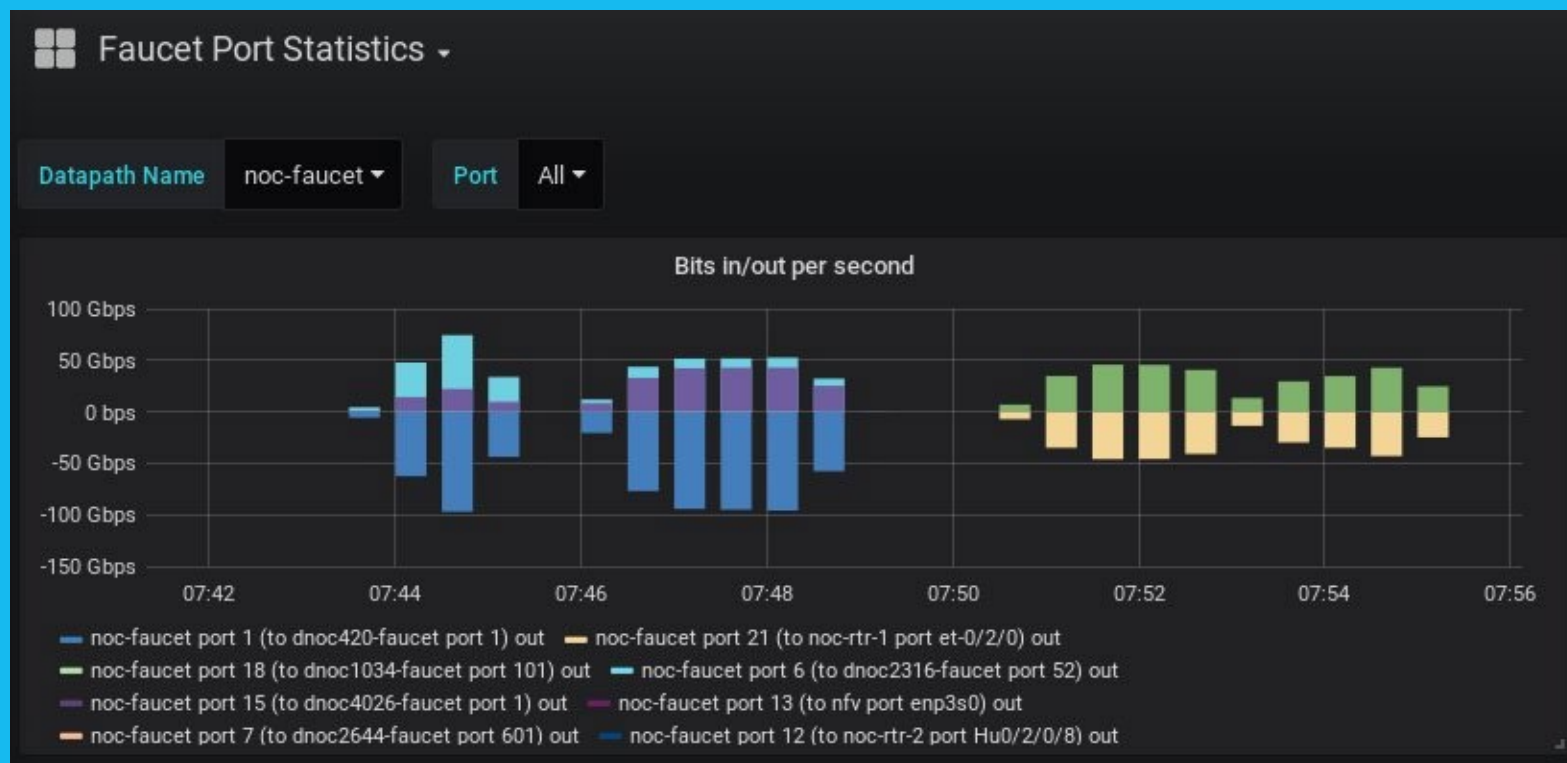
THE UNIVERSITY OF
WAIKATO
Te Whare Wānanga o Waikato

<https://faucet.nz/>

@faucetsdn

WANZ
Network Research Group

Faucet



SC18

Dallas, TX | hpc
inspires.



UNIVERSITY
of
OTAGO

1st REANNZ participant to
flow in excess 10G of traffic
internationally

15G+ disk to disk sustained to
Energy Sciences Network
(ESNet) in the USA



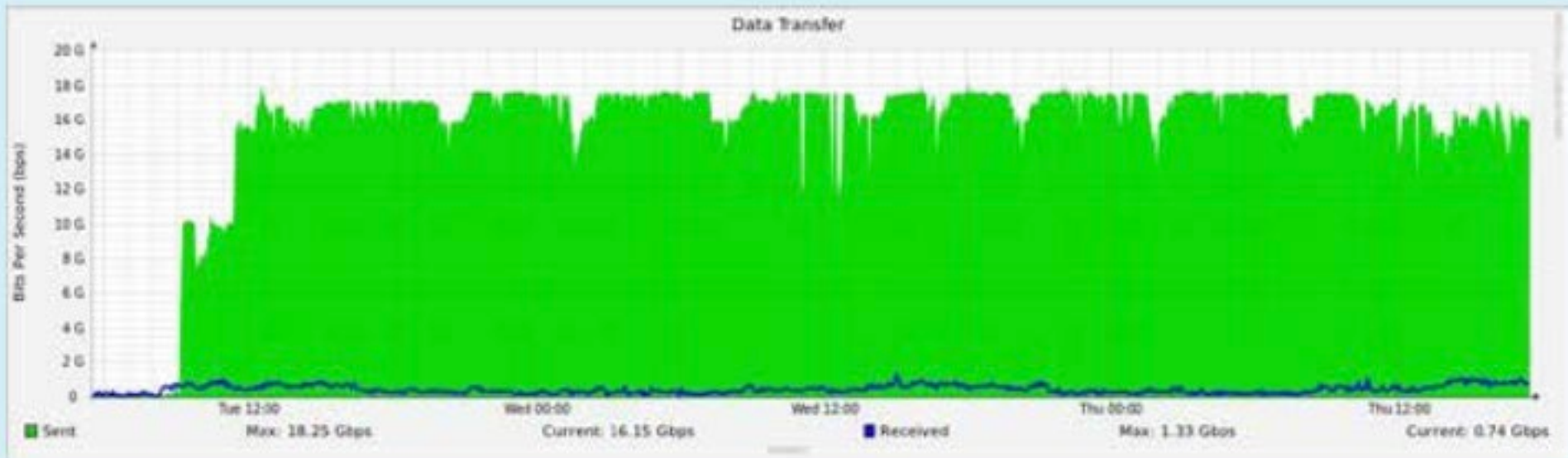
1st direct 100G connection

Direct 10G “Science DMZ”
connection for nectarcloud
directly to REANNZ

When the NeSI/NIWA supercomputers were replaced in early 2018, REANNZ engineers were on hand to make sure the research and education advanced network smoothly handled the transfer of an estimated 900 TB (terabytes) of user data.



With peak transfer speeds topping 19 Gbps it was the largest one-off transfer of data undertaken on the REANNZ network

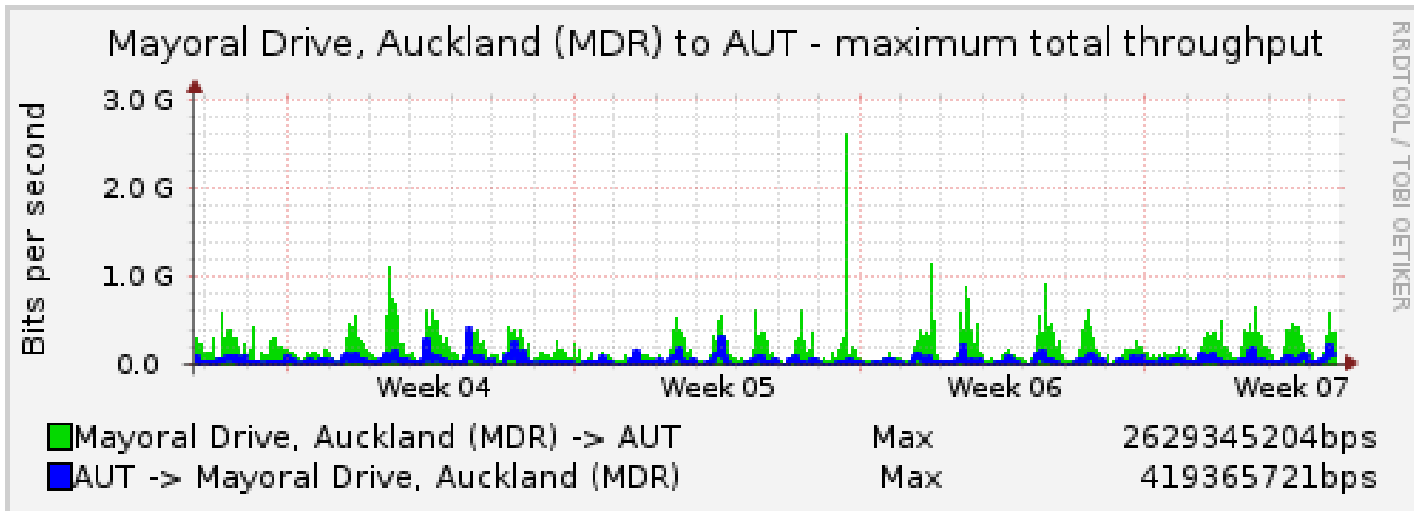
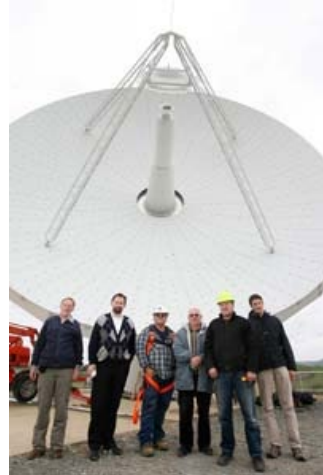




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of
OTAGO

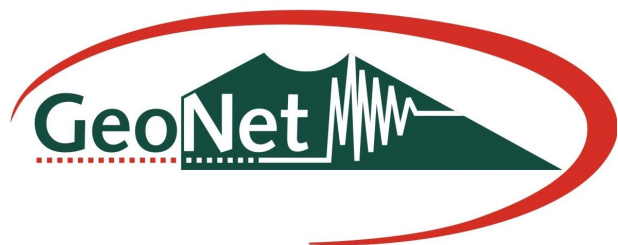
DNAneXus





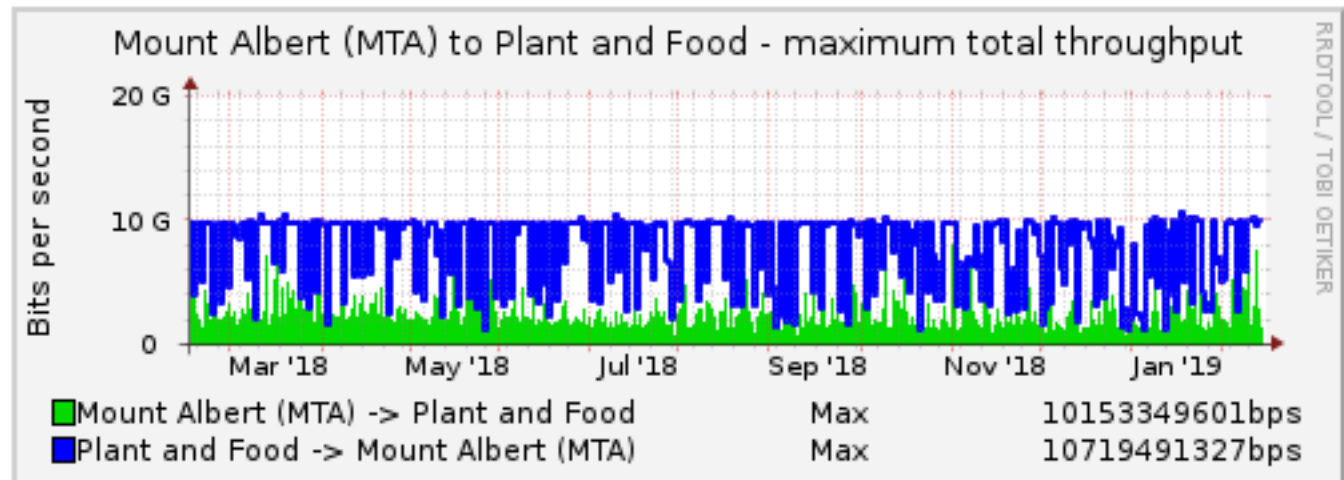


National Geohazards Monitoring Centre



Plant & Food RESEARCH

RANGAHAU AHUMARA KAI

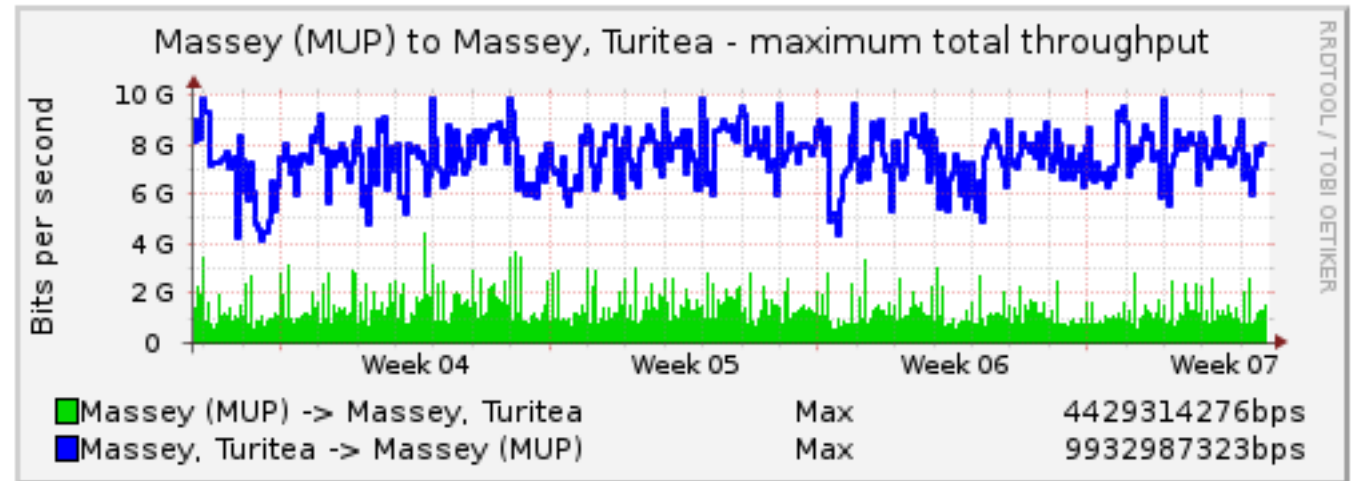


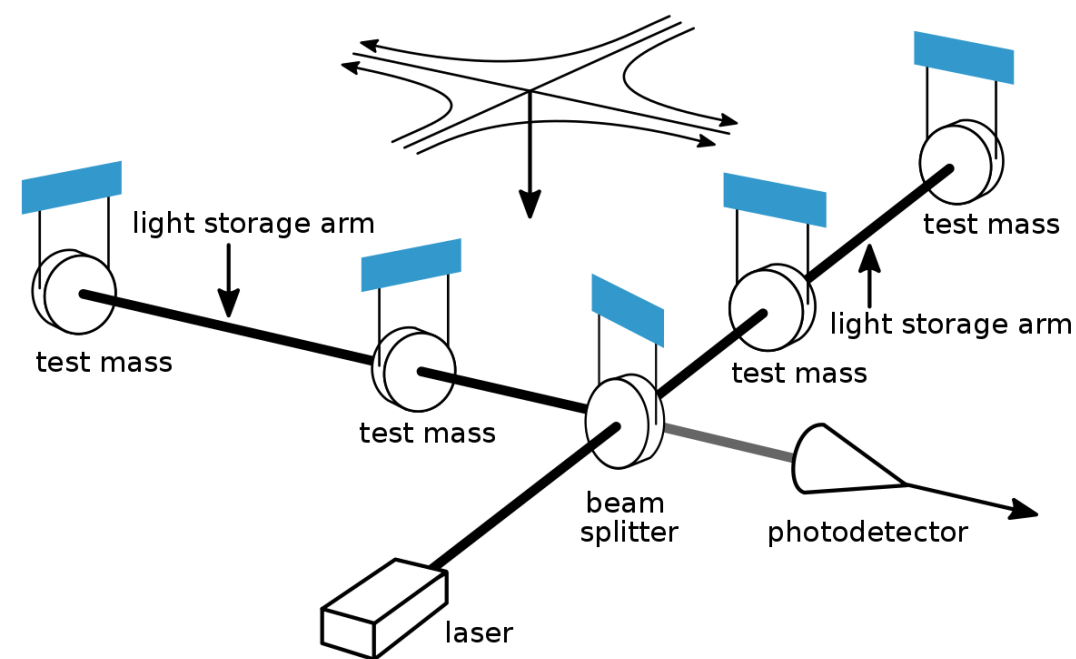
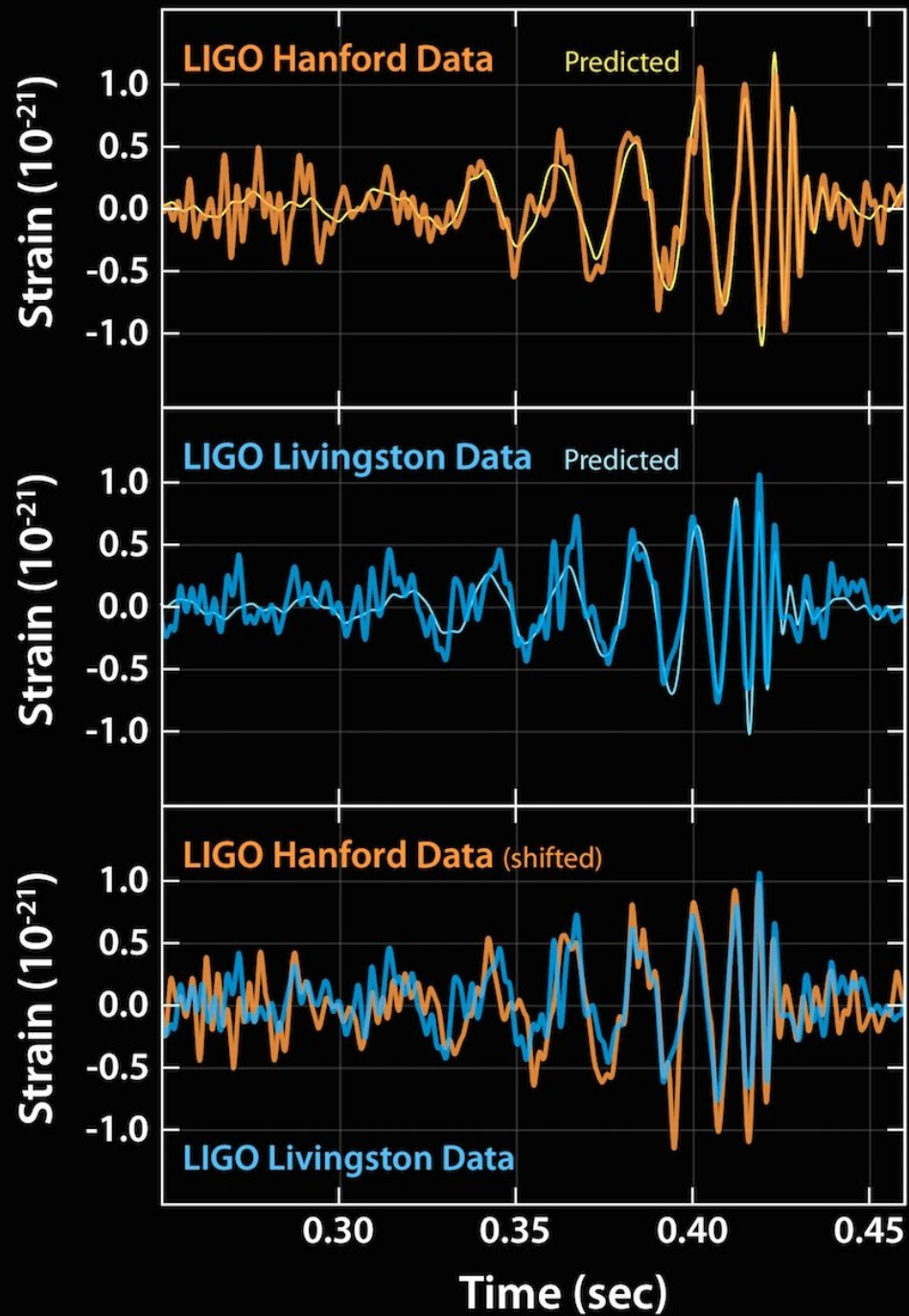


MASSEY UNIVERSITY

TE KUNENGA KI PŪREHUROA

UNIVERSITY OF NEW ZEALAND







SKA1-LOW

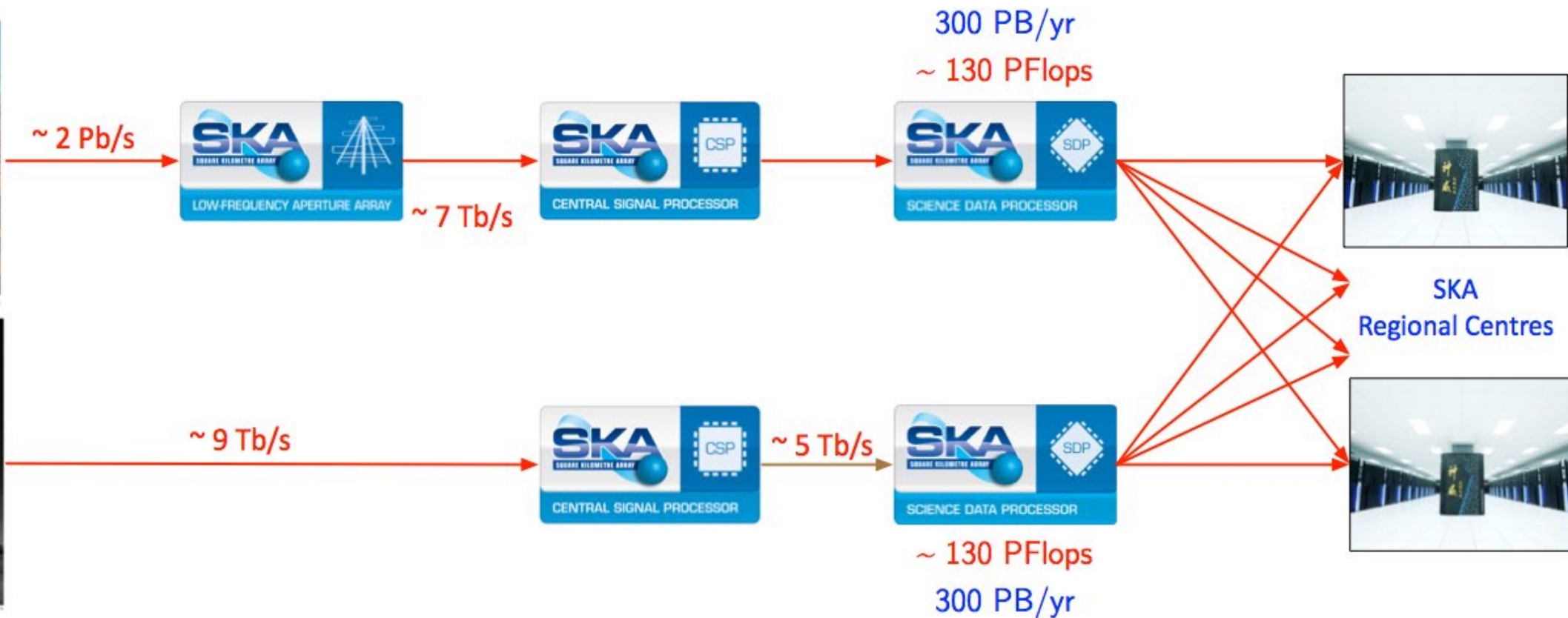


Photo: OpenView/CSIRO



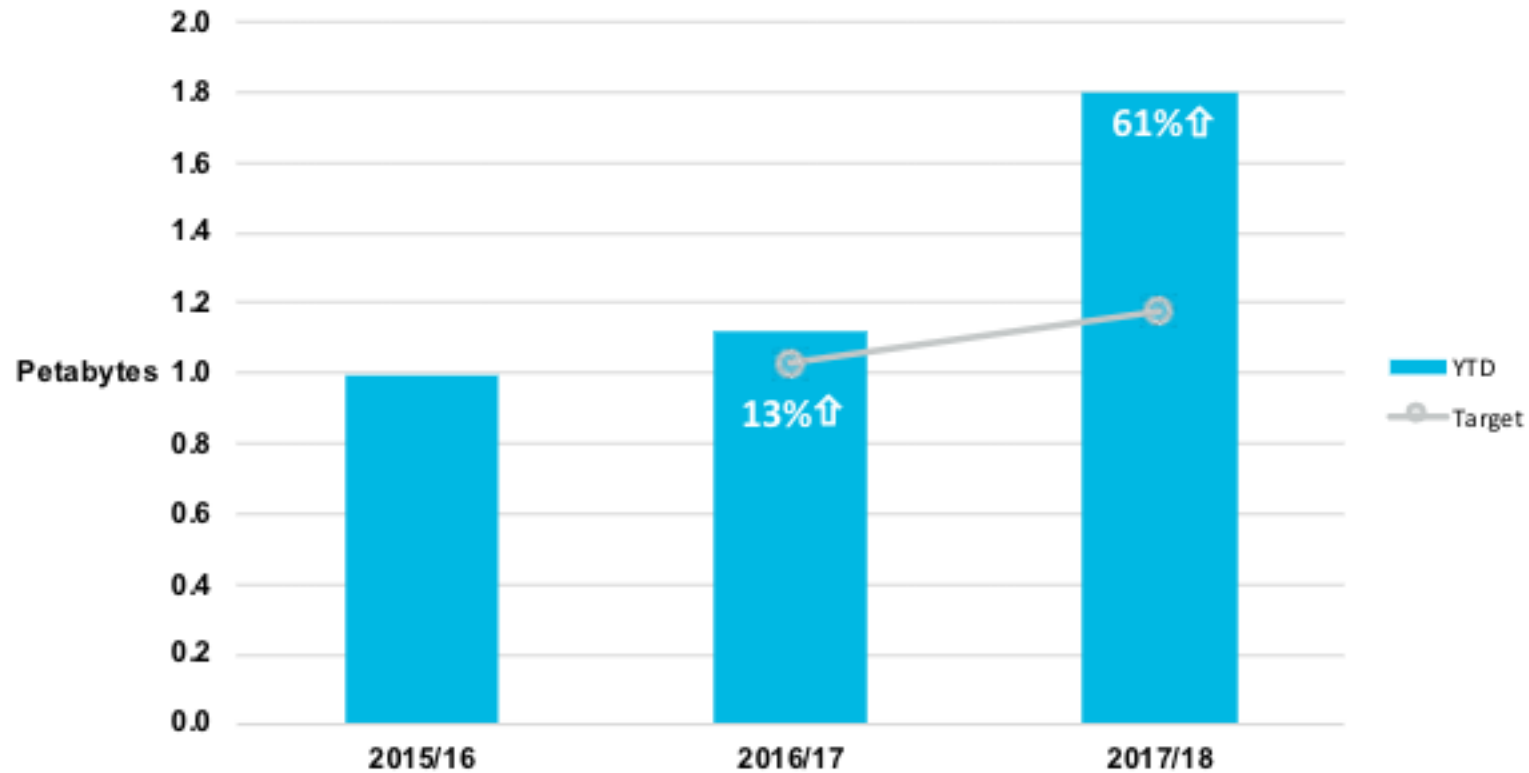
Photo: SKA Organisation

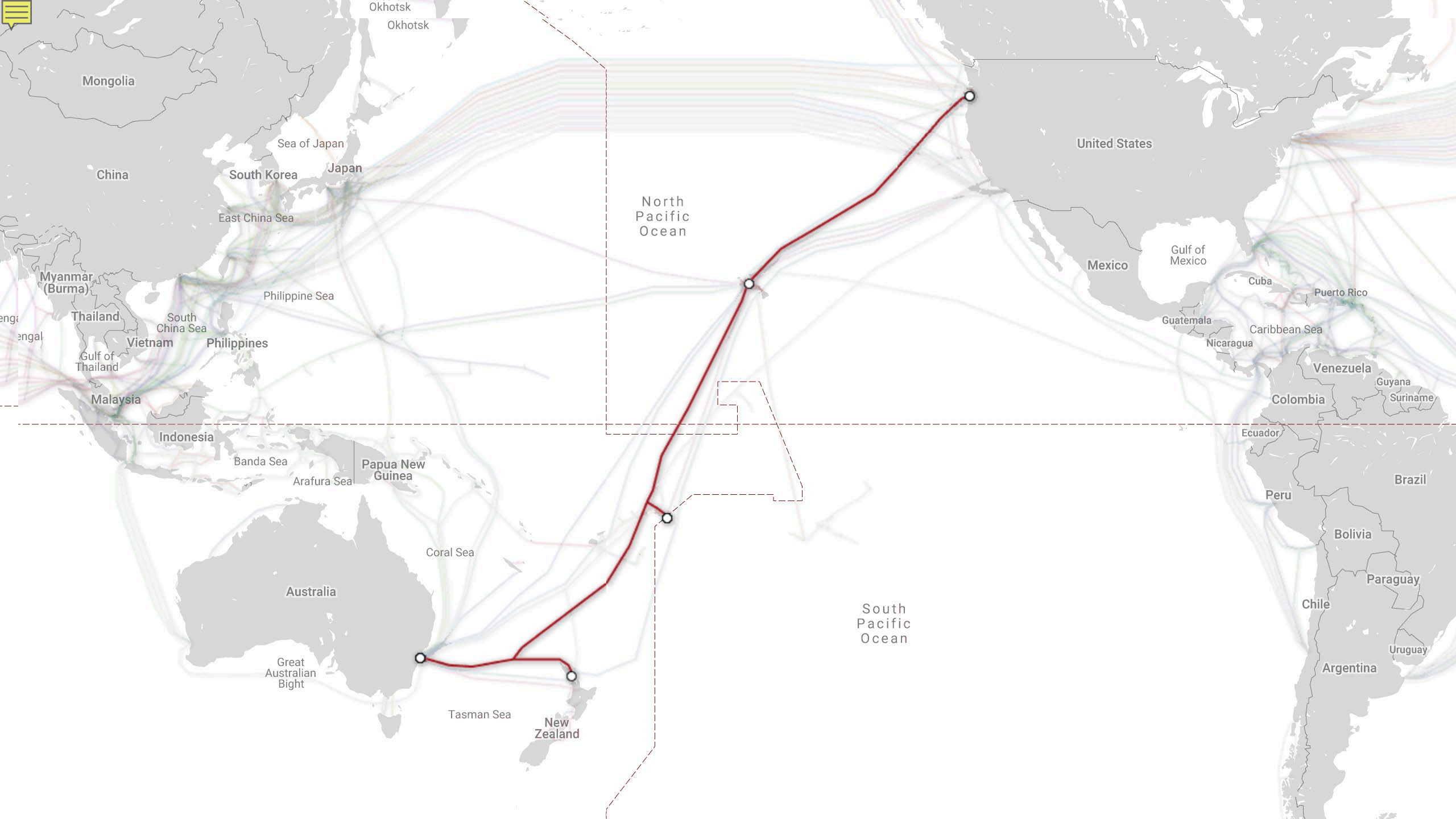
SKA1-MID



This year REANNZ saw a 61% year-on-year increase in international research data traffic.

Research & education traffic growth



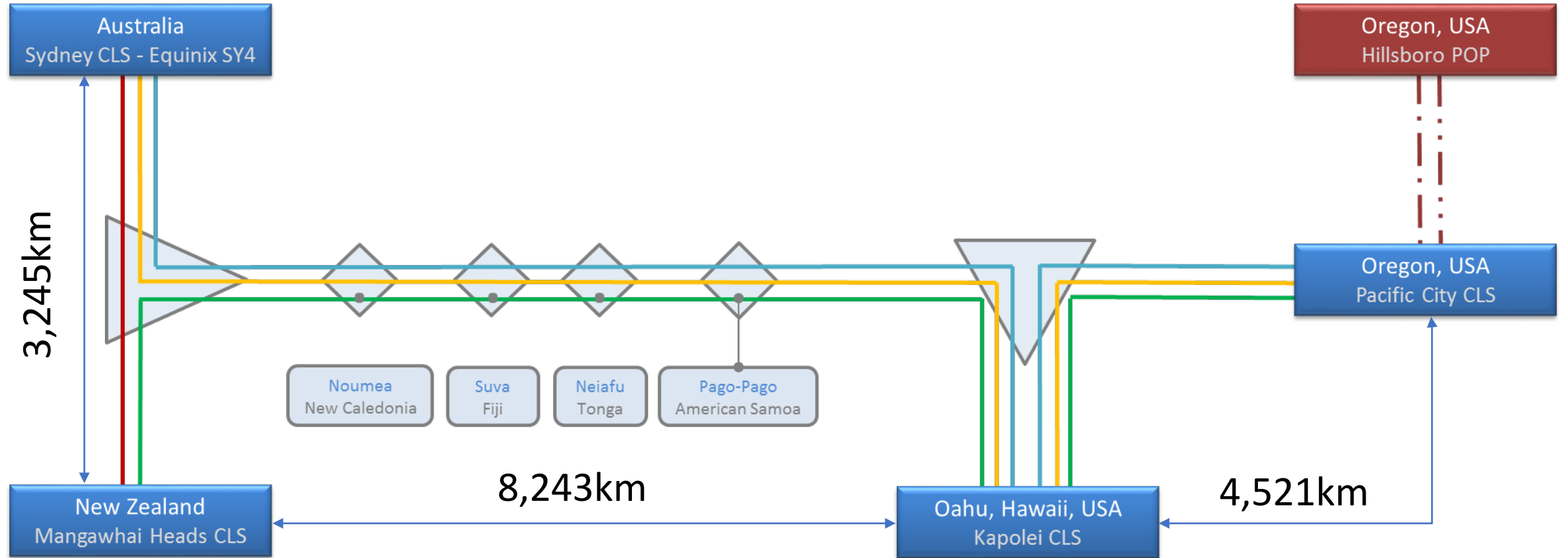


OUR NEW INTERNATIONAL NETWORK

- New PoP's
 - Flexential Brookwood - Hillsboro, Oregon, US
 - PNWGP – Seattle, Washington, US
 - Equinix SY4 – Sydney, Australia
 - Hawaiki Cable Landing Station – Mangawhai Heads, NZ
- Pacific Wave peering in Seattle, AARNet peering in Sydney
- Direct peering with providers and with other NRENs
- Continued partnership with AARNet provides diversity
- New options to extend to Guam in partnership with University of Hawaii

HAWAIIKI

NETWORK DESIGN

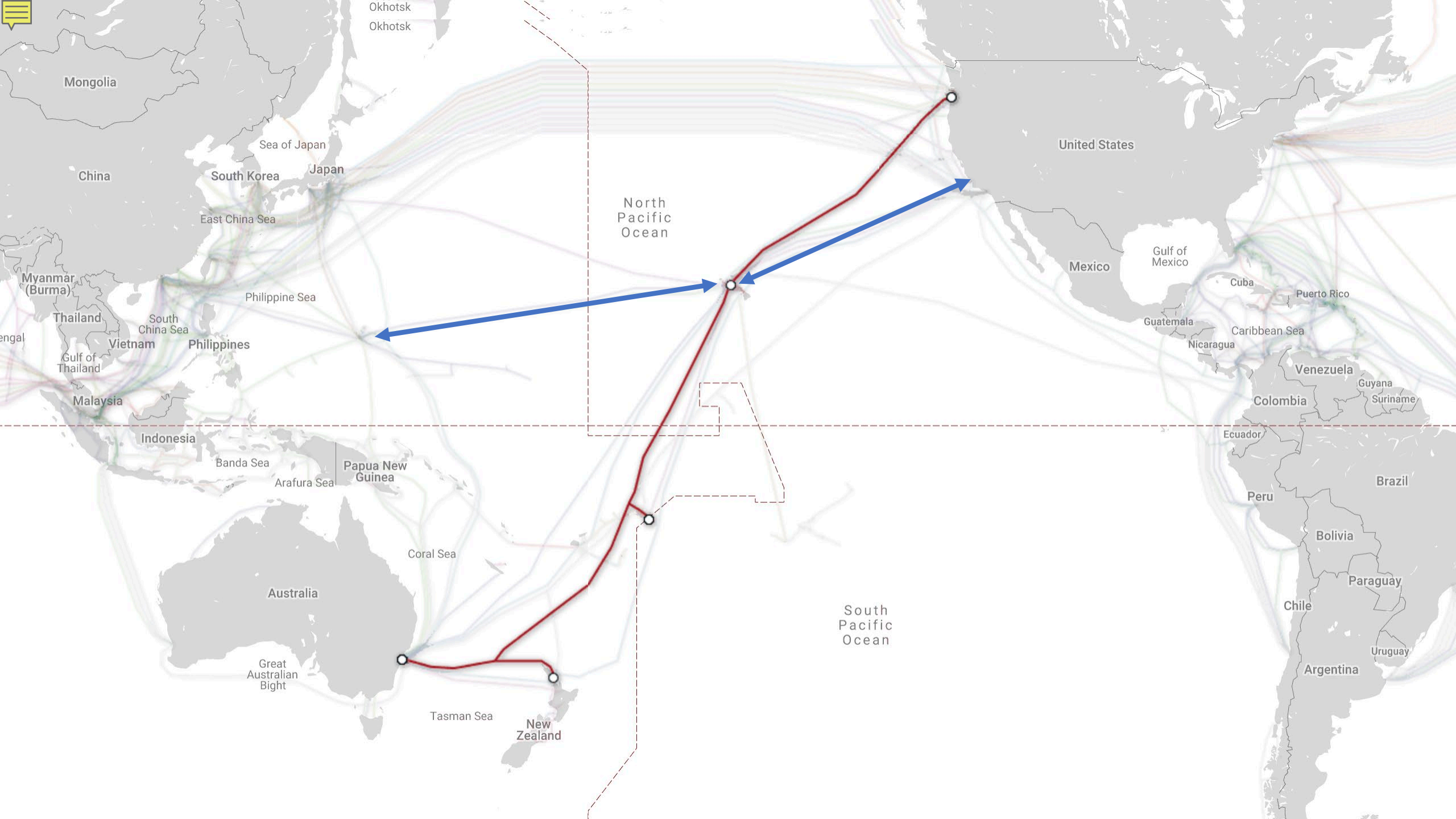




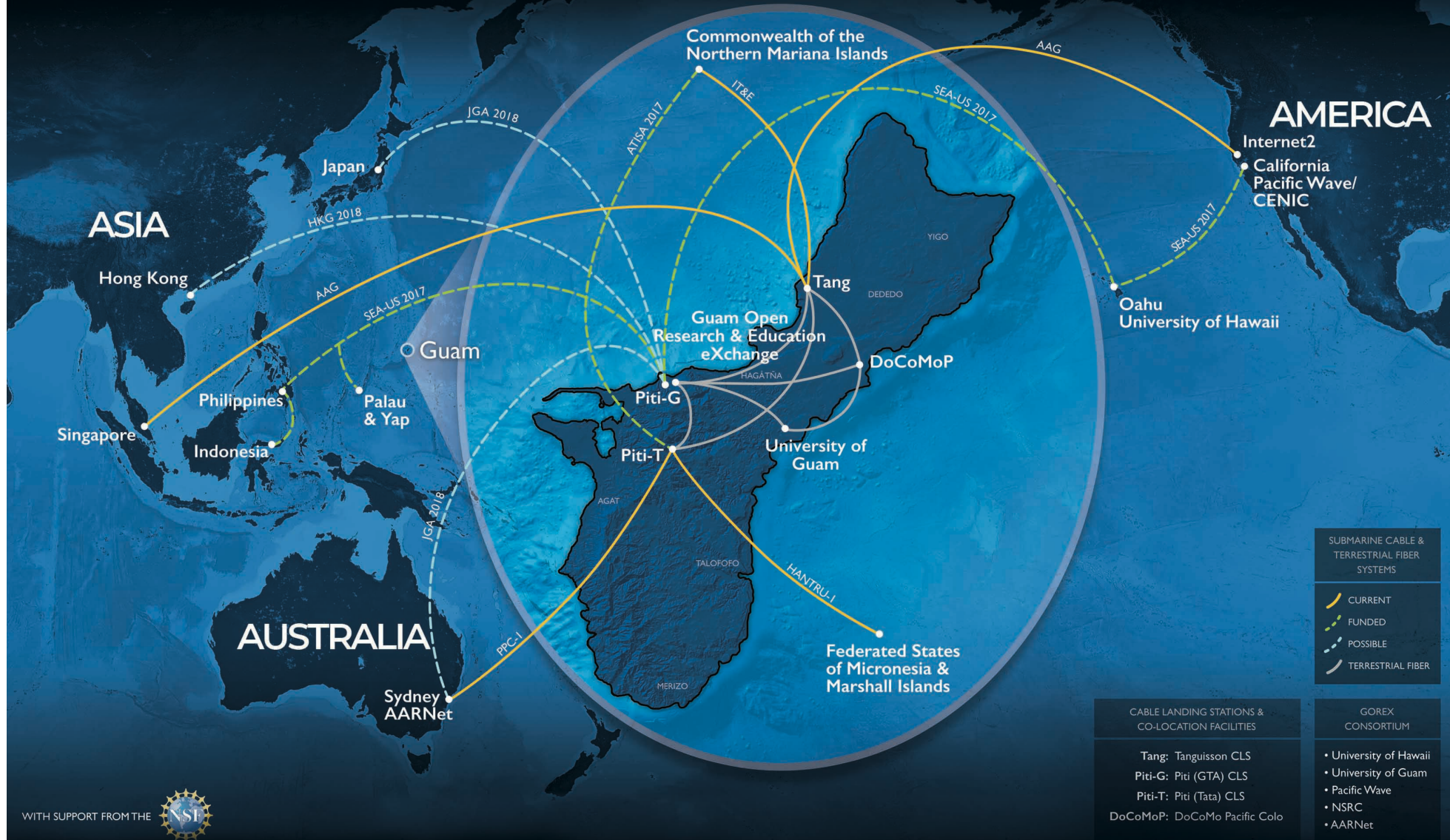
HAWAIIKI

SPECIFICATIONS

- Design capacity of 43.8 Tbps:
 - Over 100 individual 100Gbps wavelengths carried over each fibre pair
- 33ms latency from New Zealand to Sydney
 - 3,245km
- 127ms latency from New Zealand to Oregon
 - 12,764km
 - via Hawaii (82ms, 8,243km)
- Total of more than 14,600km of cable
- 25 year Service Contract between REANNZ & Hawaii
 - 20Gbps in both directions through to 2Tbps



GOREX: Guam Open Research & Education eXchange

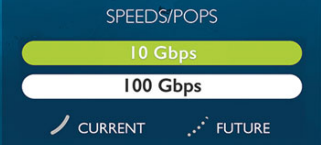
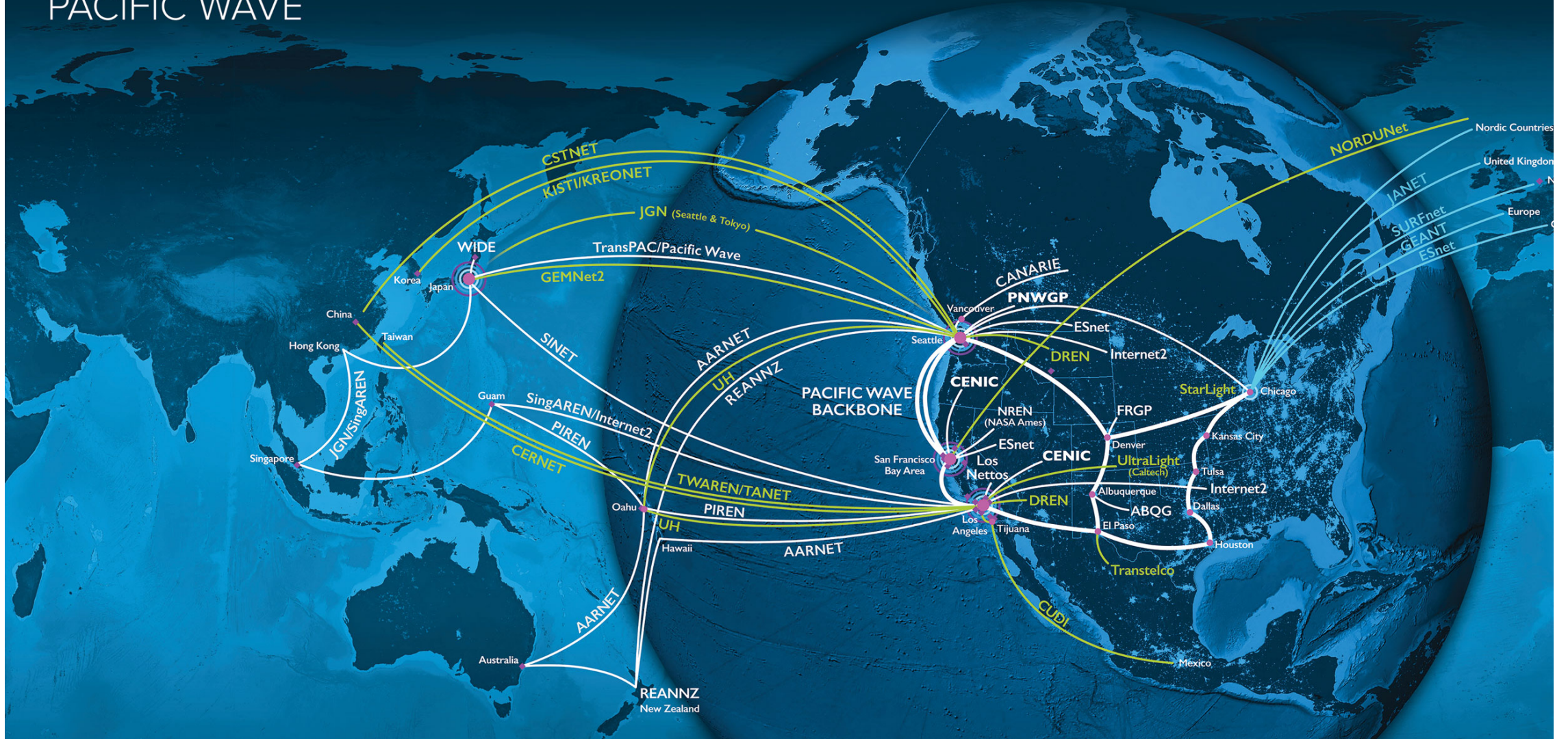




PACIFIC WAVE

United States

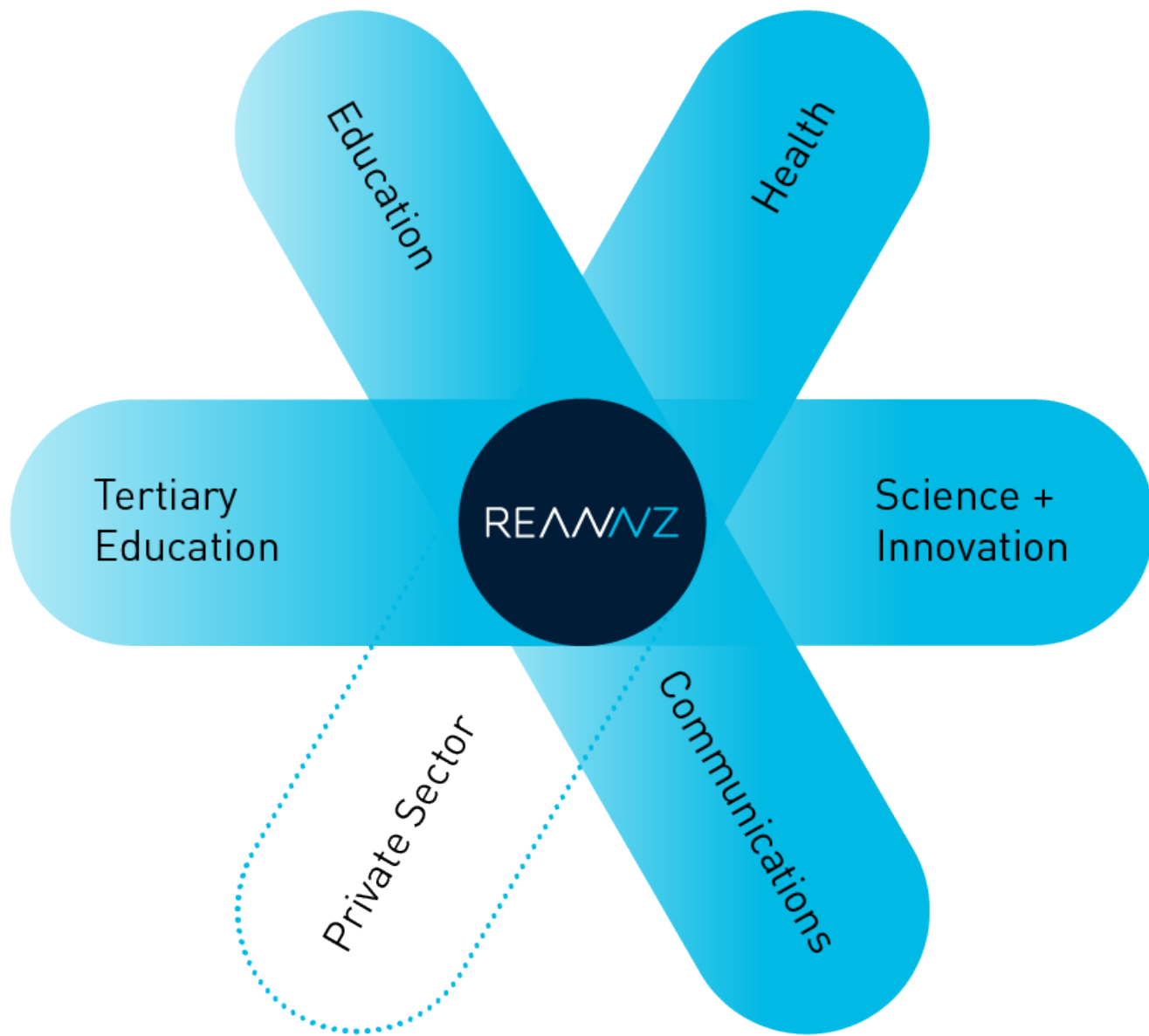
<https://pacificwave.net/participants-affiliations>



- Pacific Wave POPs
- ◆ Pacific Research Platform (PRP)
- PRP Science DMZ Fabric
- Software Defined Network
- Commercial Peering Points (Amazon, Google, & Microsoft)

- WESTERN REGIONAL NETWORK
States served by WRN members:
- ABQG: New Mexico GigaPoP
 - CENIC: California
 - FRGP: Colorado and Wyoming
 - PNWGP: Washington, Montana, Alaska, Oregon & Idaho
 - UH: Hawaii





Thank you!

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